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SUMMARY

Teledesic Corporation ("Teledesic"), an applicant for authority to construct, launch and operate a hybrid fixed satellite service ("FSS")/mobile satellite service ("MSS") non-geostationary orbit ("NGSO") satellite system respectfully submits the following comments in response to the Commission's Third Notice of Proposed Rulemaking and Supplemental Tentative Decision adopted by the Federal Communications Commission ("Commission" or "FCC") in the above-captioned proceeding.

- o NGSO satellite systems are inherently global in scope and require global spectrum allocations.
 - Global broadband satellite systems operating in the 27.5 - 30.0 GHz band ("28 GHz band") will be able to provide to all the world's citizens universal access to vital information services which are becoming increasingly essential to economic development, health care, education and other public services.
 - The 17.7 - 30.0 GHz band (the "Ka band") was allocated internationally to the FSS at the 1971 World Administrative Radio Conference and is the only portion of the spectrum that can practically accommodate a global, broadband satellite system.
 - Preservation of the 28 GHz band for global satellite services is necessary if domestic companies are to fulfill this country's vision for the National Information Infrastructure and the Global Information Infrastructure.
- o Although Teledesic believes it is unsound spectrum policy to authorize local multipoint distribution service ("LMDS") in any portion of the 28 GHz band, in the interest of creating certainty and for purposes of facilitating an expeditious resolution of this proceeding in advance of the 1995 World Radiocommunication Conference ("WRC-95"), Teledesic supports the FCC's proposed 28 GHz band segmentation plan.
 - The arguments against the redesignation of any portion of the 28 GHz band to a redundant local broadcast technology like LMDS have been thoroughly articulated in this proceeding but apparently have been rejected by the FCC.
 - Given the adverse impact on satellite services of an LMDS designation in the Ka band, it is imperative that adequate provision be made now in the U.S. Table of Frequency Allocations for GSO and NGSO satellite systems in the Ka band and that those positions be advocated aggressively at WRC-95 and other international forums.

- o The proposed 28 GHz band segmentation plan redesignates 1000 MHz of spectrum for LMDS and provides LMDS proponents with precisely the spectrum they claim to need to operate a competitive LMDS system.
 - The Commission should adopt a local priority designation for LMDS in the United States in that portion of the 28 GHz band proposed for LMDS.
 - A local priority designation tracks the approach being advanced internationally.
 - In order to preserve the availability of the 27.50 - 28.35 GHz band on a secondary basis for gigalink terminals and gateways for NGSO satellite systems like Teledesic, the 19.300 - 19.425 and 19.575 - 19.700 GHz downlink bands should be paired with GSO uses at the 29.25 - 29.50 GHz uplink band.
- o Teledesic supports the designation in the 28 GHz band of 1000 MHz of spectrum on a primary (28.35 - 28.60 GHz and 29.5 - 30.0 GHz) or co-primary (29.25 - 29.5 GHz) basis for GSO satellite systems. Such a band plan will meet the requirements for Hughes' proposed Spaceway system and will be sufficient to accommodate several other GSO satellite systems.
- o For both GSO and NGSO satellite systems to be accommodated in the Ka band, band segmentation is required.
 - As the Commission recognizes, attempting to accommodate GSO satellite systems and NGSO satellite systems in the same frequency bands is highly problematic.
 - The existing GSO satellite regulatory regime can be left in place in portions of the Ka band where GSO satellite systems will be accorded primary status with a separate portion of the Ka band designated on a primary basis for NGSO satellite systems.
 - In the portion of the Ka band designated on a primary basis for NGSO satellite systems, a separate set of service rules should be adopted to address the distinct characteristics of such systems.
- o For both LMDS and satellite systems to be accommodated in the Ka band, band segmentation is required because co-frequency sharing in the 28 GHz band between service links for satellite systems and the proposed LMDS is not feasible.
- o Teledesic supports designation of the 28.6 GHz and 18.8 - 19.3 GHz bands for service links for NGSO satellite systems

- As the FCC's preliminary technical analyses correctly indicates, 500 MHz of spectrum is the minimum amount of spectrum that must be designated on a primary basis for NGSO satellite system service links to ensure deployment of a viable NGSO satellite system.
- To garner international support at WRC-95 for the United States' proposal to allocate primary spectrum for service links for NGSO satellite systems, it is essential that the United States pair uplink and downlink spectrum domestically for NGSO satellite systems.
- Because it is not technically feasible for NGSO satellite systems to operate their downlinks below 18.8 GHz, it is unacceptable to designate paired uplink and downlink bands for NGSO satellite systems operating below 28.6 - 29.1 GHz (Earth-to-space) and the 18.8 - 19.3 GHz (space-to-Earth) bands.
- The FCC should designate the 28.6 - 29.1 GHz and 18.8 - 19.3 GHz bands for both FSS and MSS.
 - The FSS/MSS distinction is not meaningful in allocating spectrum for NGSO satellite systems where the space segment is in motion.
- o Teledesic opposes any FCC action to eliminate or relegate to secondary status the MSS allocation at 29.5 - 30.0 GHz. Such action would conflict with the actions at the 1992 World Radiocommunication Conference and may have an adverse effect on the United States at WRC-95.
 - Unless Teledesic's MSS needs are accommodated in the same portion of the 28 GHz band proposed for NGSO satellite systems (i.e., 28.6 - 29.1 GHz and 18.8 - 19.3 GHz), any change in the existing MSS allocation in the 29.5 - 30.0 GHz band would adversely affect NGSO satellite system applicants like Teledesic proposing MSS use in the Ka band.
- o For the United States to be effective in securing an adequate allocation of spectrum at WRC-95 for service and feeder links for NGSO satellite systems, the FCC must conclude its deliberations concerning the domestic use of the 28 GHz band prior to commencement of the WRC-95.
 - If sufficient spectrum in the Ka band is not allocated at WRC-95 to accommodate the requirements of Teledesic and other NGSO satellite systems proposed in the Ka band, the random deployment of GSO satellite networks between now and WRC-97 will preclude the ability of future WRCs to establish an adequate designation of spectrum at the Ka band on a priority basis for NGSO satellite networks.

- Teledesic believes that the U.S. position at WRC-95 on the designation of Ka band spectrum for service links for NGSO satellite systems will be adopted at WRC-95 and that a contingency plan for domestic use of the 28 GHz band is not necessary.
- Teledesic strongly opposes any efforts by Loral/QUALCOMM Partnership, L.P., Constellation Communications, Inc. or others not presently proposing to operate MSS feeder links in the Ka band to stall resolution of the 28 GHz band plan in order to provide them some additional measure of flexibility for plans that do not include use of the Ka band.
- o Before using a competitive bidding procedure to award licenses for satellite systems in the Ka band, the FCC is statutorily mandated to pursue all means of avoiding mutual exclusivity among applicants, such as providing parties with the opportunity to negotiate an agreement to avoid mutual exclusivity or convening a negotiated rulemaking committee to reach a spectrum sharing plan.
- o The FCC should defer consideration of service rules for NGSO satellite systems operating in the Ka band and proceed immediately to adopt a domestic 28 GHz band plan that confirms the commitment of the United States to global satellite systems.
 - Consideration of service rules now is likely to delay the adoption of a domestic 28 GHz band plan prior to WRC-95 and will ultimately hamper United States efforts to obtain much needed designations for NGSO service and feeder link use at WRC-95.
- o After the FCC has adopted a 28 GHz band plan, the Commission should adopt stringent threshold financial, technical, service and legal requirements to ensure the prompt disposition of insincere applicants.
 - Applicants for broadband NGSO satellite systems in the 28 GHz band need their own financial qualifications test that reflects the unique nature of these systems.
 - An applicant for a broadband NGSO satellite system should not be allowed to rely on an internal balance sheet to meet the FCC's financial requirement unless the financial commitment for the project is shown to be secured by explicit and irrevocable board action and is clearly reflected on the company's balance sheet and the audited financial statements.
 - While some minimum upfront financing requirement is necessary to weed out insincere applicants for broadband NGSO satellite systems in the 28 GHz band, the financial requirement should reflect the tiered and sequential nature of the financing process.

- An irrevocable financial commitment at the time of filing in the \$20 to \$50 million range would be sufficient to weed out insincere filings.
- In the event the FCC is unable, despite all reasonable efforts, to avoid mutual exclusivity for satellite system applicants in the Ka band, a modified form of competitive bidding may be appropriate. However, use of domestic auctions for licensing a global satellite system raises international issues that need to be thoroughly considered and resolved before such a procedure is adopted.

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of)	
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Rulemaking to Amend Parts 1,)	
21 and 25 of the Commission's Rules)	CC Docket No. 92-297
to Redesignate the 27.5 - 29.5 GHz)	
Frequency Band, to Reallocate the)	
27.5 - 30.0 GHz Band, to Establish Rules)	
and Policies for Local Multipoint)	
Distribution Services and the)	
Fixed Satellite Service)	
)	
and)	
)	
Suite 12 Group Petition for Pioneer's)	PP-22
Preference)	

COMMENTS OF TELEDESIC CORPORATION

To: The Commission

I. INTRODUCTION

Teledesic Corporation ("Teledesic"), an applicant for authority to construct, launch and operate a hybrid fixed satellite service ("FSS")/mobile satellite service ("MSS") non-geostationary orbit ("NGSO") satellite system, by its attorneys and pursuant to Section 1.415 of the Rules and Regulations of the Federal Communications Commission ("FCC" or "Commission"), 47 C.F.R. § 1.415, respectfully submits the following comments in response to the Commission's Third Notice of Proposed Rulemaking and Supplemental Tentative Decision in the above-captioned proceeding.¹

¹ Rulemaking to Amend Parts 1, 21 and 25 of the Commission's Rules to Redesignate the 27.5 - 29.5 GHz Frequency Band, to Reallocate the 27.5 - 30.0 GHz Band, to Establish Rules and Policies for Local Multipoint Distribution Services and the Fixed Satellite Service, FCC 95-287, CC Docket No. 92-297 (released July 28, 1995)("Third NPRM").

In the Third NPRM, the Commission proposes a band segmentation plan in the 27.5 - 30.0 GHz band ("the 28 GHz band") to accommodate local multipoint distribution service ("LMDS") systems, geostationary orbit ("GSO") satellite systems operating in the FSS, NGSO satellite systems operating MSS feeder links in the FSS, and NGSO satellite systems operating in the FSS. While the redesignation of a portion of the 28 GHz band for LMDS does not represent optimum spectrum management policy, Teledesic believes that the FCC's proposed plan is a reasonable accommodation of the competing interests. See Third NPRM, at para. 44, et. seq. Teledesic urges the FCC to proceed immediately to adopt its proposed domestic 28 GHz band segmentation plan. Prompt FCC action in the band plan is essential if the United States is to succeed at the upcoming World Radiocommunication Conference ("WRC-95" or "Conference") in obtaining spectrum designations for both service and feeder links for NGSO satellite systems in this band.

While it is imperative that a 28 GHz band segmentation plan be adopted in advance of WRC-95, it would be premature for the Commission to consider the adoption of service rules governing NGSO satellite system operations in the 28 GHz band until after the close of the public comment period for Ka band satellite applications, when the universe of applicants for satellite systems seeking authority to operate in the 28 GHz band has been identified. Public Notice, DA 95-1689 (July 28, 1995) ("Public Notice"). More importantly, consideration of service rules for NGSO satellite systems in the 28 GHz band at this time would make it nearly impossible for the FCC to adopt a domestic 28 GHz band segmentation plan prior to the commencement of WRC-95. Failure to adopt such a plan prior to WRC-95 may be

interpreted internationally as a lack of support by the United States for NGSO satellite service and feeder link designations in the 17.7 - 30.0 GHz band (the "Ka band").

II. DISCUSSION

A. Global Broadband Satellite Systems Require Access Worldwide To The 28 GHz Band

Global broadband satellite systems operating in the 28 GHz band will be able to provide to all the world's citizens universal access to vital information services which are becoming increasingly essential to economic development, health care, education and other public services. See Third NPRM, at paras. 17 and 23-24. NGSO satellite systems are inherently global in scope and require global spectrum allocations. The Ka band was allocated internationally to the FSS at the 1971 World Administrative Radio Conference and is the only portion of the spectrum that can practically accommodate a global, broadband satellite system. Preservation of the 28 GHz band for global satellite services is necessary if domestic companies are to fulfill this country's vision for the National Information Infrastructure and the Global Information Infrastructure. As a general principle, the U.S. should not authorize an incompatible terrestrial service in spectrum bands internationally allocated to satellite services. The arguments against the redesignation of any portion of the 28 GHz band to a redundant local broadcast technology like LMDS have been thoroughly articulated in this proceeding but apparently have been rejected by the FCC. Given the adverse impact on satellite services of an LMDS allocation in the band, it is even more imperative that adequate provision be made for GSO and NGSO satellite services in the 28 GHz band and that these positions be advocated aggressively at WRC-95 and other international forums.

B. If The FCC Authorizes LMDS In A Portion of the 28 GHz Band, The Proposal Contained In The Third NPRM Is Reasonable

Despite Teledesic's belief that it is unsound spectrum policy to authorize LMDS in any portion of the 28 GHz band, in the interest of creating certainty and for purposes of facilitating an expeditious resolution of this proceeding in advance of WRC-95, Teledesic supports the FCC's proposed 28 GHz band segmentation plan.² See Table 1. This domestic band plan proposes to designate 1000 MHz on a primary or co-primary basis to LMDS systems;³ 1000 MHz of spectrum on a primary or co-primary basis to GSO satellite systems operating in the FSS; 400 MHz of spectrum on a co-primary basis for NGSO satellite systems operating MSS feeder links; and 500 MHz of spectrum on a primary basis for NGSO satellite

² By addressing the needs of all pertinent services, the 28 GHz band plan does not optimize the amount of spectrum available for any type of proposed use. Because there already is excess demand for the limited spectrum available in the 28 GHz band, all authorized uses of the 28 GHz band should be mandated to utilize digital technology by the respective service rules. Teledesic Ex Parte Filing - CC Docket No. 92-297, The FCC Should Require All Authorized Uses of the 28 GHz Band to Be Digital, CC Docket No. 92-297 (filed June 7, 1995). Such a requirement will ensure the most spectrally-efficient use of the band and will facilitate the full deployment of all authorized uses of the 28 GHz band.

³ Although the FCC tentatively concludes that LMDS spectrum cannot be used to provide mobile radio services using existing technology, Teledesic urges the Commission to remove any ambiguity regarding LMDS uses and confirm that LMDS will be limited to fixed point-to-multipoint services. Teledesic supports the FCC's proposal to define a LMDS system as a fixed point-to-multipoint radio system consisting of LMDS Hub Stations and their associated LMDS Subscriber Stations. Third NPRM, at Appendix B. Specifically, the FCC proposes to define a LMDS Hub Station as a fixed point-to-multipoint radio station and an LMDS Subscriber Station as a fixed station. Id.

systems operating in the FSS. As will be discussed below, adoption of the proposed 28 GHz band segmentation plan will provide sufficient spectrum for each proposed system type.

27.5	28.35	28.60	29.1	29.25	29.5	30.0 GHz
LMDS fss	GSO/FSS ngso/FSS	NGSO/FSS gso/fss	MSS FEEDER LINKS & LMDS	MSS FEEDER LINKS & GSO/FSS	GSO/FSS ngso/FSS	

PROPOSED BAND SEGMENTATION PLAN⁴
TABLE 1

LMDS Designation In Band Segmentation Plan. Since 1991, some LMDS advocates have claimed that they need access to 1000 MHz of spectrum in the 28 GHz band to establish an analog video distribution system. See e.g., Third NPRM, at paras. 29-32; Rulemaking to Amend Part 1 and Part 21 of the Commission's Rules to Redesignate the 27.5 - 29.5 GHz Frequency Band and to Establish Rules and Policies for Local Multipoint Distribution Service, 8 FCC Rcd 557, at paras. 8-9 (1993).⁵ The proposed 28 GHz band segmentation plan redesignates 1000 MHz of spectrum for LMDS and provides LMDS proponents with precisely the spectrum they claim to need to operate a competitive LMDS system. Thus, in a recent FCC filing, CellularVision of New York, L.P. ("CVNY") endorsed the plan. Specifically, CellularVision stated that "the Commission articulated a reasoned plan that would allow

⁴ According to the FCC's proposal, services designated by capital letters would be accorded primary status and services designated by small letters would be accorded secondary status.

⁵ GHz Equipment Co., Inc., an equipment manufacturer, systems integrator and LMDS proponent, recently filed an ex parte presentation stating that "... a minimum of 750 MHz per licensee is essential to fulfill the promise of the varied millimeter wave applications we see flowing from new LMDS services, including competition to traditional cable with fiber (whose channel capacity is comparable to that of a 750 MHz LMDS system.)" Ex Parte Presentation of GHz Equipment Co., Inc., ET Docket No. 94-124 (filed June 8, 1995).

CVNY to provide its LMDS service" CellularVision of New York, L.P. Reply To Opposition to Supplemental Motion to Expedite, 1-CF-P-94 (July 31, 1995).

The FCC proposes to designate LMDS as a "primary" or "co-primary" service. Third NPRM, at para. 47. Teledesic urges the FCC to clarify the meaning of "primary" and "co-primary" as it relates to LMDS in order to allay objections expressed by members of the international community. Various foreign administrations have expressed concern in WRC-95 preparatory meetings that any action by the FCC to amend the Domestic Table of Frequency Allocations to redesignate as primary any portion of the 28 GHz band to LMDS ultimately may lead to the reduction in spectrum available internationally for satellite services. In the absence of clarification by the FCC, such concerns are likely to adversely affect adoption of the United States' positions at WRC-95. In order to preserve the availability of the Ka band internationally for satellite services, Teledesic urges the Commission to adopt a local priority designation for LMDS in the United States in that portion of the 28 GHz band proposed for LMDS rather than amend the Domestic Table of Frequency Allocations to establish a primary or co-primary designation for LMDS. This approach is consistent with and tracks the approach being advanced internationally where a local priority will be afforded LMDS in certain locations. In this way, the international availability of the 28 GHz band for satellite services will be preserved and foreign nations will be more likely to support the United States proposals at WRC-95. Furthermore, a local priority designation is consistent with the FCC's proposed LMDS assignment scheme where licenses will be issued by discrete local geographic service areas using competitive bidding.

GSO Designation In Band Segmentation Plan. Currently, GSO satellite systems enjoy primary status in all of the spectrum in the 4.0 - 8.0 GHz band (the "C band") and the 10.0 - 16.0 GHz band (the "Ku band"). Teledesic supports, in addition, the designation in the 28 GHz band of an additional 1000 MHz of spectrum on a primary or co-primary basis for GSO satellite systems in the space-to-Earth direction to support multiple 28 GHz band GSO FSS systems. Third NPRM, at para. 21. Such a band plan will meet the requirements for Hughes' proposed Spaceway system and will be sufficient to accommodate several other GSO systems operating in the FSS. See Third NPRM, at paras. 19-20; see also Public Notice. Teledesic also supports the FCC's proposed designation in the 28 GHz band of an additional 1350 MHz of spectrum in the Earth-to-space direction on a secondary basis to satellite systems operating in the FSS. All total, this band plan provides GSO FSS systems with access to 2.35 GHz of the 2.5 GHz of spectrum available in the 28 GHz band.

In addition to seeking comment on the band segmentation scheme for GSO uplink uses, the FCC also seeks comment on whether to designate and pair the 18.30 - 18.55 GHz downlink band with the 29.25 - 29.5 GHz uplink band for GSO uses or to pair such GSO uplinks with downlinks at the 19.300 - 19.425 and 19.575 - 19.700 GHz bands. Third NPRM, at para. 65. In the Third NPRM, the FCC recognizes that limited sharing of the 27.50 - 28.35 GHz band between LMDS and gateway and gigalink terminals of NGSO satellite systems can be achieved. Third NPRM, at para. 39. Designation of the 18.30 - 18.55 GHz band for GSO downlinks will not advance the public interest because it will reduce the paired spectrum available for NGSO gateways and gigalink terminals in the 27.50 - 28.35 and 17.70 - 18.55 GHz bands given the sharing difficulties between NGSO and GSO

satellite systems. Teledesic, therefore, supports the designation of the 19.300 - 19.425 and 19.575 - 19.700 GHz downlink bands for pairing with GSO uses at the 29.25 - 29.50 GHz uplink band. Such action will preserve the availability of the 27.50 - 28.35 GHz band on a secondary basis for gigalink terminals and gateways for NGSO satellite systems like Teledesic. Third NPRM, at para. 45.

NGSO MSS Feeder Link Designation In Band Segmentation Plan. Currently, only two NGSO satellite systems operating in the MSS propose to operate their MSS feeder links in the 28 GHz band. The FCC conditionally authorized Motorola Satellite Communications to construct feeder uplinks in the 29.1 - 29.3 GHz band. Motorola Satellite Communications, Inc., 10 FCC Rcd 2268, at para. 17 (1995). TRW Inc. was conditionally authorized to construct feeder uplinks in the 29.7 - 30.0 GHz band. TRW Inc., 10 FCC Rcd 2263, at para. 15 (1995). The FCC's proposed 28 GHz band segmentation plan will accommodate the uses proposed by TRW Inc. ("TRW") and Motorola Satellite Communications, Inc. ("Motorola") and should be adopted as proposed -- 250 MHz of spectrum at the 29.25 - 29.5 GHz band and 150 MHz of spectrum at the 29.1 - 29.25 GHz band would be designated on a co-primary basis for MSS feeder links and MSS feeder links would be authorized on a "reverse band working" basis in the 19.4 - 19.7 GHz band. Third Notice, at paras. 59-66.

In comments filed in this proceeding on August 28, 1995, Loral/QUALCOMM Partnership, L.P. ("Loral") and Constellation Communications, Inc. ("Constellation") attempt to reserve the right to additional Ka band spectrum for NGSO MSS feeder link use in the event the United States' efforts at WRC-95 to secure MSS feeder link spectrum for them

outside the Ka band are unsuccessful.⁶ See Comments of Loral/QUALCOMM Partnership, L.P. at 2; Comments of Constellation Communications, Inc. at 2. Teledesic strongly opposes any efforts by Loral, Constellation or others not presently proposing to operate MSS feeder links in the Ka band to stall resolution of this band plan in order to provide them some additional measure of flexibility for plans that do not include use of the Ka band. The 28 GHz band segmentation plan proposed by the FCC was derived as a result of lengthy deliberations and negotiations among all interested and affected parties. The very delicate balance struck in the band plan among the many divergent interests (and their resulting support for the plan) will be upset if the FCC attempts retroactively to allocate additional spectrum for NGSO MSS feeder link use.

Several studies conducted by International Telecommunication Union study groups in preparation for WRC-95 have shown that at least two NGSO MSS feeder links can share spectrum in the Ka band. If necessary, the 400 MHz of spectrum that is proposed by the FCC to satisfy the requirements of TRW and Motorola also can be used by other applicants for NGSO satellite systems to meet their MSS feeder link requirements. Therefore, there is no need to defer action on the 28 GHz band plan until the conclusion of WRC-95 because there is an adequate amount of spectrum proposed by the FCC for MSS feeder links to accommodate other NGSO MSS feeder links. Certainly, the plans of all the parties seeking to operate in the Ka band should not be held up for Loral, Constellation or others who may decide they want to use the band in the future.

⁶ Loral, Constellation and other NGSO systems proposing to operate in the MSS have specified operation of their MSS feeder links outside of the Ka band. Teledesic supports their efforts to secure adequate spectrum outside the Ka band.

Other Allocation Proposals in the 28 GHz Band. In the Third NPRM, the FCC tentatively concludes that FSS and MSS systems cannot share the same frequencies and requests comment on whether to eliminate the allocation for MSS at 29.5 - 30.0 GHz or whether to modify the MSS allocation as a secondary allocation to FSS systems at 29.5 - 30.0 GHz. Third NPRM, at para. 67. Teledesic opposes any FCC decision to eliminate or relegate to secondary status the MSS allocation at 29.5 - 30.0 GHz. First, such action would conflict with the 1992 World Radiocommunication Conference ("WRC-92") decision allocating the 29.9 - 30.0 GHz band for GSO MSS/FSS uses. Second, such action may have an adverse effect on the United States at WRC-95. Announcements of GSO satellite systems proposing MSS use of the 29.5 - 30.0 GHz band have been made in Canada and in several other foreign countries. Action by the FCC to eliminate or designate to secondary status the MSS allocation in the 29.5 - 30.0 GHz band may lead to retaliation against the United States and its proposals for international satellite allocations at WRC-95.

In addressing the use of the 29.5 - 30.0 GHz band, the FCC must not lose sight of the fact that such spectrum is the only portion of the Ka band presently available for MSS use. For that reason, Teledesic has requested a portion of the 29.5 - 30.0 GHz band to extend the broadband communications capabilities of its network to certain mobile applications. Any change in the existing MSS allocation in the 29.5 - 30.0 GHz band would adversely affect NGSO satellite system applicants like Teledesic proposing MSS use in the Ka band. However, as is demonstrated in Section F below, Teledesic's MSS needs can be accommodated in the same portion of the 28 GHz band proposed for NGSO satellite systems

(i.e., 28.6 - 29.1 and 18.8 - 19.3 GHz) if the FCC in this proceeding designates such spectrum for both MSS and FSS NGSO satellite system use.

C. The FCC Must Designate Spectrum In The 28 GHz Band On A Primary Basis To NGSO FSS Use

1. Evolution of NGSO Satellite Systems

For more than three decades, GSO satellites have been virtually the exclusive means of providing space-based communications. The GSO has some major drawbacks, however, not the least of which is the minimum transmission delay of approximately half a second in a round-trip communication through a GSO satellite. These drawbacks have been tolerated because satellite technology did not practically admit to any other approach. But that is rapidly changing.

In recent years, a number of major NGSO satellite systems have been proposed to meet a range of service needs. Teledesic's proposed global broadband hybrid FSS/MSS NGSO satellite system will use several hundred satellites to provide broadband channels supporting voice, videoconferencing, interactive multimedia and real-time, digital network connections with a service cost comparable to urban wireline networks. Unlike GSO satellite systems, a NGSO satellite system like that proposed by Teledesic will be able to achieve communication transmissions with the low delay required to provide "fiber-like" interconnection with the terrestrial broadband networks. The low altitude also enables the use of small antennas and compact electronics.

Because NGSO satellites move in relation to the Earth's surface, to provide continuous coverage of any given point on Earth requires, essentially, global coverage. Thus, NGSO

satellite systems are by their nature global and have the inherent capability to offer the same quality and quantity of capacity to users in the developing world as they do to users in the most advanced markets. In this sense, NGSO satellite systems are a fundamentally egalitarian technology that promises to radically transform the economics of telecommunications infrastructure.⁷ Because NGSO satellite systems are inherently global, they will provide service to all areas of the world, including those places to which no one would extend service for its own sake. The "externalities" of these systems offer the potential for vast humanitarian benefit to those parts of the world most at risk of being left behind by the Information Revolution.

While the global nature of NGSO satellite systems offers vast humanitarian benefit to all the world, it also poses unique challenges to the international regulatory structure governing space-based communications. Global satellite systems require global satellite spectrum allocations. And because GSO systems and NGSO systems have fundamentally different system characteristics, different spectrum allocations and coordination procedures are required for each. Satellite technology is changing rapidly, and the domestic and international regulatory structure applicable to its deployment must adapt as well, as the FCC and the United States government have recognized. See generally Third NPRM; United States Proposals for the 1995 World Radiocommunication Conference, (July 1995) ("WRC-95 Report").

⁷ While GSO satellite systems also can provide service at a cost indifferent to location, their capacity can be and increasingly is focused through high-power spot beams on the most lucrative service areas. Also, GSO satellites do not provide uniform coverage; service suffers in extreme latitudes.

2. The 28 GHz Band Plan Must Take Into Account The Significant Distinctions Between GSO and NGSO Satellite Systems

The regulatory structure governing satellite communications has evolved to fit the characteristics of GSO satellites. As NGSO satellite systems have emerged, there has been an effort to accommodate those systems within the existing regulatory structure. That response has been essentially *ad hoc*, as the NGSO satellite systems are still generally viewed as a special case rather than an emerging trend. GSO and NGSO satellite systems have fundamentally different system characteristics which need to be accommodated through different regulatory structures. For example, GSO satellite systems can share the same frequencies with two degree orbital arc separation between satellites in the GSO orbital plane. NGSO satellite systems, however, cannot share frequencies in this manner. NGSO satellites, however, can enable greater spectrum efficiency than GSO satellites because they are closer to Earth and thus have a smaller footprint within which frequencies can be reused. Whereas a number of GSO satellite systems can operate over a wide band of spectrum with each assigned its own geographic “slot,” NGSO systems can co-exist with each other through band segmentation, with each system assigned its own slice of spectrum.⁸ Each method conforms to the essential characteristics of the system to which it applies. However, the two methods cannot be combined.

⁸ Co-frequency sharing among non-GSO satellite systems may be possible but cannot be evaluated meaningfully until another such system is proposed. These sharing issues are complex, involving considerations of system geometry and signal design. Sharing becomes a statistical function based on the frequency and duration of interference. Generally, however, for non-GSO systems with broad coverage to accommodate advanced applications with a high degree of service quality and reliability, co-frequency sharing among systems is probably not possible and band segmentation is required.

As the Commission recognizes, attempting to accommodate GSO satellite systems and NGSO satellite systems in the same frequency bands is highly problematic. See id. Any attempt to modify the existing order to accommodate GSO and NGSO satellite systems in the same way in all bands inevitably will be unsatisfactory to all concerned. For both GSO and NGSO systems to be accommodated in the Ka band, band segmentation is required. The existing GSO satellite regulatory regime can be left in place in portions of the Ka band where GSO satellite systems will be accorded primary status, with a separate portion of the Ka band designated on a primary basis for NGSO satellite systems. In the portion of the Ka band designated on a primary basis for NGSO satellite systems, a separate set of service rules should be adopted to address the distinct system characteristics of such systems.⁹ A separate primary NGSO allocation would reverse to this limited extent the primary status GSO systems currently enjoy in all FSS bands.¹⁰

3. The 28 GHz Band Plan Must Take Into Account The Technical Incompatibility Between NGSO Satellite Systems and LMDS

Co-frequency sharing in the 28 GHz band between service links for NGSO satellite systems and the proposed LMDS is not feasible. As the Commission recognizes, the Negotiated Rulemaking Committee established by the FCC to attempt to develop a sharing plan that would accommodate LMDS systems and satellite systems in the 28 GHz band

⁹ The FCC already has employed this approach in other portions of the radio spectrum by requiring satellite systems operating in the MSS in the 1 - 3 GHz band to operate their MSS service links only in NGSO orbits. Amendment of the Commission's Rules and Policies Pertaining to a Mobile-Satellite Service in the 1610-1626.5/2483.5 - 2500 MHz Frequency Bands, 9 FCC Rcd 5936, 5945 (1994).

¹⁰ As the Commission recognizes in the Third NPRM, this approach does not preclude the possibility of sharing between GSO and NGSO satellite systems. With some systems for some applications, sharing may be possible between the two system types. The proposed 28 GHz band plan provides for secondary use by GSO FSS uses in bands designated on a primary basis for service links for NGSO satellite systems and for secondary use by NGSO satellite systems in bands designated for GSO FSS uses on a primary basis.

concluded that it was not feasible for LMDS stations and the ubiquitous FSS user transceivers proposed by NGSO and GSO satellite systems to share the same frequencies. See Report of the LMDS/FSS 28 GHz Band Negotiated Rulemaking Committee, at 85 (Sept. 23, 1994).

Teledesic's own technical analysis confirms that even with the "optimistic" antenna side lobe patterns proposed by LMDS advocates in their sharing analyses, the interference between the LMDS and NGSO satellite systems operating in the FSS is so severe that co-frequency sharing of the 28 GHz band is not possible. See Teledesic Corporation, "Optimistic" Antenna Sidelobes Patterns Do Not Solve The Interference Problem Between FSS and LMDS.

Further, technical studies by LinCom Corporation, MITRE Corporation and the National Aeronautics and Space Administration ("NASA") all confirm that sharing between NGSO satellite system operators in the FSS and the LMDS is not feasible. LinCom Corporation, Evaluation of Bellcore's Interference Analyses for Co-Frequency Sharing of the 28 GHz Band by the Local Multipoint Distribution Service (LMDS) and the Fixed Satellite Service (FSS), (June 9, 1995)¹¹; LinCom Corporation, Review of GeoWave Proposal for the Co-Frequency Sharing of the 28 GHz Band by the Local Multipoint Distribution Service (LMDS) and the Fixed Satellite Service (FSS), (June 28, 1995); MITRE Corporation, Critique of the Bellcore Report, (June 9, 1995); NASA, Ex Parte Filing, (June 7, 1995). Consequently, because LMDS cannot engage in co-frequency sharing with NGSO satellite systems, separate segments of the Ka band spectrum are required to be designated on a primary basis to NGSO satellite systems.

¹¹ While the FCC acknowledges the filing by MITRE Corporation and NASA of filings disputing Bellcore's methodology, the Commission failed to recognize the submission in this docket of a similar study by LinCom Corporation.

D. The Proposed Designation of 500 MHz of Spectrum on a Primary Basis for NGSO FSS in the 28 GHz Band Plan Is The Minimum Amount of Spectrum Required For NGSO Systems Operating In The FSS

In the Third NPRM, the FCC proposes to designate 500 MHz of spectrum on a primary basis, at the 28.6 - 29.1 GHz band, to NGSO FSS use. Third NPRM, at para. 56.¹² As the FCC's preliminary technical analyses correctly indicates, 500 MHz of spectrum is the minimum amount of spectrum that must be designated on a primary basis for NGSO service links for NGSO satellite systems to ensure deployment of a viable NGSO satellite system. Any designation of less than 500 MHz for this purpose will inhibit the growth of global satellite services and may preclude the deployment of any broadband, interactive global NGSO satellite system in the 28 GHz band. See Third NPRM, at para. 145.¹³ See Public Notice. In fact, as demonstrated below, the public interest warrants the designation of more than 500 MHz of spectrum on a primary basis for NGSO satellite systems.

A primary designation of 500 MHz of spectrum for NGSO service links may be insufficient to accommodate NGSO satellite systems in the 28 GHz band. Teledesic's system alone, for example, requires 500 MHz for its uplink user terminals. Teledesic's application was recently placed on an FCC Public Notice establishing a cut-off date for competing

¹² The Commission proposes to allow GSO FSS systems to operate on a secondary basis in this band. Third NPRM, at para. 44.

¹³ In the Third NPRM, the FCC incorrectly specifies Teledesic's spectrum requirements. In order to operate its user terminals, Teledesic seeks an allocation of 500 MHz of paired spectrum in each direction at the 28.6 - 29.1 GHz (Earth-to-space) and 18.8 - 19.3 GHz (space-to-Earth) bands in which NGSO FSS use has primary status in the FCC's proposed band plan. Application of Teledesic Corporation for a Low Earth Orbit Satellite System in the Fixed Satellite Service, File No. 22-DSS-P/LA-94(840), 43-SAT-AMEND-95, 127-SAT-AMEND-95 ("Teledesic Application"). Teledesic also requests authority to operate its gateway terminals with 800 MHz of paired spectrum at the 27.6 - 28.4 GHz and 17.8 - 18.6 GHz bands. Id. Finally, Teledesic seeks FCC authority to use the 29.5 - 29.6 GHz and 19.7 - 19.8 GHz bands to provide MSS internationally.

applications. See Public Notice. Until the cut-off is concluded, it is unclear whether 500 MHz of spectrum is sufficient to accommodate the 28 GHz band NGSO satellite systems proposed only by United States companies. Additionally, since NGSO satellite systems are inherently global in nature, this minimum designation will need to accommodate any non-U.S. origin global NGSO satellite system with service links in the Ka band.

Even for a NGSO satellite system proposing less than 500 MHz for its user terminals, a primary designation of 500 MHz is necessary for operational flexibility. In its 28 GHz band plan, the Commission proposes designating the 28.35 - 28.60 GHz band and the 29.5 -30.0 GHz band on a secondary basis to NGSO FSS use.¹⁴ Third NPRM at para 56. Technical analyses conclude that the gateway terminals of NGSO satellite systems pose fewer problems for coordination than user terminals, permitting them to operate on a secondary basis to GSO FSS uses. Id. However, as the Commission recognizes, relegating all gateway terminals of a NGSO satellite system to secondary status may lead to operational uncertainty. Third NPRM, at para. 57. If these terminals are required to operate solely on a secondary basis, they would bear the burden of coordinating with domestic GSO FSS system operations and would be subject to International Telecommunications Union ("ITU") Radio Regulation 2613 ("RR 2613"), which requires the terminals to cease operation if they cause unacceptable interference to a GSO satellite system. Id. In addition, there may be certain critical operations, such as command and control functions, performed by gateway terminals that may require their operation with some primary spectrum. A 500 MHz primary designation of spectrum in the 28 GHz band will provide any NGSO satellite system not employing the entire 500 MHz for

¹⁴ GSO FSS use would be designated as primary in these bands. Third NPRM at para. 45.